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ABSTRACT

Control of environments in which problem behaviors in mother-child interactions take place appears necessary if reliable measurement of those behaviors is to result. Investigation of situational variables should advance the behavior modification technology in general. One methodological approach towards such control is presented. It focuses on definition of those spatial and logistical properties common to the daily environments in which problem behaviors occur. Standardized laboratory situations were derived from mothers' reports of difficulties in managing their children, from study of the environments in which the difficulties typically took place, and from study of the behavior modification results of a pilot project involving 8 mother-child pairs. After the pilot study, 10 additional mother-child pairs were placed in standardized environments as an integral part of their modification program. Both the development and present uses of these laboratory analogs of problem-producing environments in daily life are presented with data showing their potential contribution to applied and conceptual efforts in understanding parent-child interaction. (Author/DP)

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MODIFYING PROBLEM BEHAVIORS IN MOTHER-CHILD INTERACTION: THE STANDARDIZED LABORATORY SITUATIONS

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Abstract

Control of environments in which problem behaviors in mother-child (M-C) interactions take place appears necessary if reliable measurement of those behaviors is to result. One methodological approach towards such control is presented. It focuses upon definition of those spatial and logistical properties common to the daily environments in which problem behaviors take place. Standardized laboratory situations were derived from M's reports of difficulties in managing C, from study of the environments in which the difficulties occurred typically, and from study of the results of behavior modification work undertaken with a pilot group of eight M-C pairs who had been placed in trial standardized situations. Following pilot work ten additional M-C pairs were placed in appropriate standardized environments as an integral part of their modification program. Both the development and present uses of these laboratory analogs of problem-producing environments in daily life are presented with data showing their potential contribution to applied and conceptual efforts in understanding parent-child interaction.

Reports concerning modification of discrete child and adult behaviors indicate consistently that when behavior modification techniques are applied systematically to target behaviors, a change in rate of occurrence will result for those behaviors. Such outcomes have been reported in work with children in a variety of settings, (1) in free-field environments, i.e., in homes (Hawkins, Peterson, Schweid & Bijou, 1966; O'Leary & O'Leary, 1967; Patterson, 1968), and on nursery school playgrounds (Allen, Buell, Harris & Wolf, 196 ; Baer, 1960; Buell, 1968), and (2) in relatively formal settings, i.e., in classrooms (Birnbrauer, Wolf, Kidder and Tague, 1965; Patterson, 1966; Zimmerman & Zimmerman, 1962) and on hospital wards for children (Ferster & DeMeyer, 1961; Lovaas, Freitag, Gold & Kassorla, 1965; Peterson & Peterson, 1968). They have been introduced also into laboratory settings where the laboratory was convenient for, but not explicitly relevant to the modification program goals (Bijou & Oblinger, 1961; Patterson, 1965). In general, these investigators concluded that systematic application of behavior modification principles had produced directly the outcome obtained for each case. Examination of these studies and their singular conclusions raises new questions.

One question concerns the relationship between environmental variables present within the modification setting, and treatment outcome. Published studies as well as films designed to communicate details of operant procedures employed with children in a variety of environments have focused primarily upon the techniques that

Both time and equipment for this program were made available through the interest and support of the administrative and professional faculties of the Crippled Children's Division of the University of Oregon Medical School. Without further assistance from graduate and undergraduate volunteers, the investigation could not have proceeded.

produced behavior change. They have deemphasized the environments in which these techniques were employed; i.e., whether a study focused upon C's behavior at mealtime, on the playground, in a classroom, or on a hospital ward, its major focus was upon the ongoing shaping procedure.

It must be pointed out, however, that the milieu in which shaping occurred was stripped of many distracting properties such as people, toys, utensils, etc. In short, environmental restrictions were imposed, but their potential contribution to treatment outcome was given low priority when results were reported or shown.

Could the reported modifications in target behaviors have been accomplished more rapidly if the environments had been more standardized? In free field situations precisely how similar were the environmental conditions under which operant level was measured in baseline, treatment and follow-up sessions? Can investigators replicate independently the results reported by colleagues? If similar treatments were imposed upon populations of individuals or pairs of individuals, how might within-group comparisons be made? These specific questions might be generalized into two questions: (1) Within a behavior modification paradigm does systematic and immediate presentation of rewarding and aversive contingencies provide a sufficient condition for modifying human behavior? (2) Would advances in theoretical and applied knowledge be facilitated by increased control of specific properties of environments in which problem behaviors are to be modified?

At the present time it is difficult to respond satisfactorily to these general and specific questions since the body of organized knowledge from which answers might be obtained seems to consist of quantities of generally successful outcome data derived from a single case or from series of single cases. These data support conclusions

about the effectiveness of the technique in single cases, but they do not permit hypothesis building about the development of behavior patterns within and across populations.

This report, then, attempted to answer some of these questions by determining and defining situation variables within the behavior modification paradigm. Specifically, the task involved the construction of empirically derived, standardized laboratory environments into which operant and modeling techniques could be introduced. Use of such standardized environments it was hypothesized would (1) increase reliability of observations, (2) provide the environmental conditions needed if valid within and between-group comparisons of behavior change were to be made, and (3) provide standard conditions for replication and study of behavioral sequences and their development over time. The relative purity of data obtained from work with animals in a Skinnerbox, it was thought should not have to be forfeited because human beings were being studied and treated, or because the behaviors to be modified were classified as social, complex behaviors.

Few investigators concerned with parent-child interaction have focused formally upon the contribution of environmental factors to experimental or treatment outcomes. A little-noted position paper by Bell (1964), one of the earliest in this area, presents two theses (1) that only after restricting the environment in which C's problem behavior appears can reliable investigation be undertaken to determine the relevant parent behavior that maintains it; and (2) that increased experimenter control and improved theory development should result from such restrictions. Ullman and Krasner (1966, p. 61) acknowledged both the difficulties involved in modifying social behaviors and the unrefined status of current efforts in this area, while Findley (1966) has been the first to make explicit the case for standardizing environments in which human

social interactions are to be studied.

Development of the Standard Situations

Within the context of a behavior modification program designed to shape M's to shape C's behavior during their interaction, the following question was investigated: Do daily events, in which Ms report or are observed to have difficulty in managing C, contain properties that could define discrete laboratory situations? It was hypothesized that if such properties that could differentiated, they might provide occasions in the laboratory for the appearance of the problem behaviors. The problem behaviors of both C and M could then be observed and modified systematically.

Detailed interviews, primarily, behavior-oriented in focus, were undertaken with a pilot group of M-C pairs. To provide a standardized, yet open-ended interview procedure M-C interaction difficulties were explored initially in the areas measured by the Vineland Social Maturity Scale. Thus, all Ms had an opportunity to discuss similar areas of general concern in child management. The goal of the interview was to gather information concerning specific behaviors of each pair member and the occasions on which these behaviors occurred. To help Ms accomplish this task they were asked, "When C does X, what do you do?" "What does C do then?" "On what occasions can you expect the problem interaction between you to occur?" "How frequently in a day or in a week does this management difficulty occur?"

Ms tended to report their management difficulties with C in the form, "C never stops...." "I can't get C to ...." "C doesn't ever...." etc. That is, Ms reported in detail problem behaviors for C, but could not specify their own behaviors prior to or following C's behaviors. Table I summarizes the range of occasion and C behaviors which Ms reported as problem producing.

Insert Table I about here

A simple model based upon the conditions shown in Table I was then formulated to include all possible spatial and logistical properties of those occasions in which reported management difficulties occurred. Since the modification program was designed to shape M to shape C using a modification of Wahler's procedure (1965), the model was phrased in terms of the logistics of M. Given a room, a relatively standard set of toys and a M-C pair, there are a finite number of general arrangements that involve M's interaction with C. The model conceptualizes this finite range of possibilites around one central condition, the presence or absence of M. In terms of this model then, occasions on which M's and C's difficulties in interaction occur can be interpreted as follows:

M Present	M Absent
a) M moves towards C	a) M moves away from C
b) M feeds, dresses, communicates with C	b) M leaves dressing and feeding for C to do independently.
c) M initiates, suggests play to C	c) M follows in play activity initiated by C.
d) M attends to C.	d) M ignores C, or is occupied elsewhere.
e) M makes demands or requests of C	e) ----------
f) M is physically close to, or is in room with C.	f) M is out of room, C remains alone.

Table II translates this model into standardized laboratory situations.

Insert Table II about here

Observation of M-C interactions in the standard situations shown in Table II resulted in immediate occurrence of the problem behaviors of both M and C, however, these behaviors were not necessarily the precise behaviors reported by M in the interview. Extremely high or extremely low rate of occurrence, and appropriateness of the behavior of the situation were three criteria used to determine the presence of problem behaviors. Using these criteria, the properties of the problem-producing standardized environments were studied and refined. Using M-C pairs, then, sets of standardized environments were developed, the properties of which were considered to be sufficient to produce the problem behaviors occurring between them. These environments provided the controlled context within which problem behavior was modified.

Method

Subjects

A total of 18 M-C pairs contributed to the development and use of the standardized laboratory situations. Eight pilot pairs were needed to develop the situations and, to date, ten pairs have been used to test their effectiveness in producing problem behaviors and in facilitating the behavior modification process.

Pairs were referred to the program from the various clinics of the Crippled Childrens Division of the University of Oregon Medical School because of management problems so severe that parents at home and staff specialists in the clinics could not manage C. In general Cs had been classified as "futile to manage or take

care of", severely hyperactive, unreachable or retarded. All had one or more of the following chronic, handicapping, physical disabilities, i.e., cerebral palsy in its various forms, postencephalitic conditions, hyperactivity, deafness, absence of useful speech or mental retardation. All Cs ranged between 2-8 years in age. Families in the program represented the following range of socio-economic and educational categories: welfare to high income levels, ghetto to suburban residents, grade school to college graduates. Both white and black families participated.

Equipment and Laboratory Setting

Volunteer assistants consisting of undergraduate psychology majors, psychology interns, pediatric fellows, graduate students in speech pathology, physical and occupational therapists and a volunteer mother with a college degree constituted the various four-man teams required to work with a pair. They were trained to carry out tasks involving use of the equipment, recording of behaviors in the standard situations, transforming of data, and modeling alternative behaviors for M. Their participation in the program ranged from periods of three months to three years.

An Esterline-Angus 20-channel event recorder (Esterline Angus Instrument Company, Indianapolis, Indiana), a Bug-in-the-Ear one-way wireless intercommunication system (Farrall Instrument Company, Grand Island, Nebraska) and an Ampex Video-Tape Recorder constituted the equipment necessary to expedite the program for any pair.

Two rooms connected by a one-way mirror provided the setting for observing and recording activities.

A supply of toys provided occasions for both active and quiet activity, and was available for each session, however, each pair received no more than five different kinds of toys throughout its entire program.

Specific Procedures

Initial Interview: All Ms appeared for an initial interview (details already reported) following which they were (1) acquainted with program procedures, (2) shown the observation room and the recording equipment and (3) introduced to the members of the team who would be working with them. They were urged, but not required to permit the video-taping of their sessions for teaching purposes since they were the primary beneficiaries of the taped material. Ms learned that for the first three to four sessions the team would attempt to understand the interaction difficulties they reported and, that until this had been accomplished, no feedback from the team would be given to them. They were encouraged to observe and to think about their own and C's behaviors during the situations in which they found themselves in each session, and were advised that both their and the team's observations would be shared in a session following this initial period.

In the Treatment Interview (session #4 or #5) observations were shared and baseline data shown to M in graphic or numerical form. The goal was to train Ms to observe, think, and speak about specific behaviors that had occurred in the sessions and to note whether they occurred as antecedent to or as consequents of the problem interaction.

The Behavior Modification Program (details to be published shortly) differed from programs usually reported in that a two-stage procedure was used regularly to modify sets of M and related C behaviors. That is, broad response classes

rather than single behaviors were shaped in the standard situations.

Use of Standard Situations

The set of standard situations selected for a pair was used throughout the modification program designed for them. Not all situations shown in Table III were needed for all pairs. Their number was determined by the specific or general determinants of the daily situations in which the interaction difficulties reportedly took place, and also by the rate of occurrence of problem behaviors in the initial array of situations into which a pair had been placed during the functional analysis stage of the program. For the ten pairs studied, standard situations B, C, F, G and Z (see Table III) provided the major occasions during which interaction difficulties occurred and were modified. However, because of the two-stage program used, modification procedures for all but two pairs occurred primarily in situations B and C.

A total of 3-4 sessions with at least 2 day intervals between each permitted completion of a functional analysis of the interaction and collection of baseline data for each standard situation. Each situation was programmed for a period of 5-7 minutes, since it was found in the pilo study that longer periods of time, i.e., 15-20 minutes per situation produced rate per minute values similar to those obtained in the shorter period.

Results

Duration of the Program for Pairs

All ten M-C pairs participated in the program for a 2 to 3 month period. Sessions occurred twice weekly, with a maximum of 24 sessions for one pair and an average of 15 sessions per pair required from day of initial interview to final session. This result, it must be emphasized, refers to modification of broad response classes of M behaviors and not to modification of a single M or C behavior. In no pair was only one target behavior modified. Table III shows the number of standardized situations, duration of the program and actual number of sessions for each of the ten pairs. It appears that the number of sessions required for a pair decreases as a function of the number of standardized situations used, and probably also as a function of increased skill in using the treatment procedures.

Insert Table III about here

Data Evaluation Possibilities

Since baseline data had been collected in a variety of standardized situations, it was possible to determine from this data those situations that produced predictably the problem behaviors of M and C when they interacted. Only those situations provided the setting in which behavior modification work was undertaken. Table IV shows baseline values for an array of both M and C behaviors for one pair during their interaction in the three standard situations selected for their program -- B, child's game and rules; C, mother's game and rules; and Z, clean-up.

Insert Table IV about here

Still another evaluation approach is suggested by the availability of M and C data for each standard situation. Data from a sample of M-C pairs in one population can be compared with data from samples from other populations of M-C pairs. The standard situations provide the situational control required for valid comparisons. Table V shows a partial array of values for a sample of Ms and Cs taken from the population of pairs studied here. Three baseline, the last three shaping, and the recheck sessions for one adult and one child behavior in standard situation C, mother's game are shown.

Insert Table V about here

Discussion

With increased experimental control in the area of human interaction, new problems and questions are raised. One question is whether or not patterns of problem behaviors can be determined for Ms and Cs in specific social situations? Still another questions concerns the extent to which newly acquired M behaviors are maintained over time. Because rate values for the problem behaviors can be obtained in standard situations, answers to these questions can be pursued.

With the use of the laboratory analogs, behavior modification not only of a single behavior, but of broader response classes of M or C behaviors, i.e., chains of responses, can be accomplished and maintained by Ms in a very short period of time.

Examination of data presented in published reports shows that more than fifteen trials or sessions, have been required to modify and maintain a single behavior in a social setting. With control of situational variables established, problem behaviors of C and those behaviors of M that maintain them can be produced in each session and their modification approached systematically, i.e., the specific behavior M praises C contingently can be shaped in standard situation B (child's game). In general, Ms acquire this behavior in two to three sessions, they can maintain it without support in three to six sessions. The same situation can then be used to increase M's repertoire of "following behaviors during C's play" while she continues to reward C contingently.

In practice, use of the laboratory analogs in behavior modification work in the present program has provided possibilities for more reliable and accurate measurement of outcome. After shaping M in one standard situation, it is possible, in the laboratory, to test strength of acquisition and generalization by observing the target behaviors in one or more different, but related, situations, i.e., standard situation C (M's game in play) has been used routinely to increase M's repertoire of controlling behaviors as well as her consistent and immediate use of them. Standard situation Z (clean-up) has then been used to test M's ability to use the behaviors learned in the first situation, in a new situation that also requires her control.

One common practice of investigators in the area of behavior modification is to present behavioral changes in graphic form. This is an effective means of communication for one or two behaviors, but if sets of behaviors of M and of C are involved, graphing can not communicate the changes. For this reason, presenting behavioral data in tabular form permits more comprehensive study of M-C interaction as the values in Table IV show, i.e., C's rate of compliance to M's commands in all 3 standard

situations in the Baseline period were, with one exception, on the ratio of 1:3 or more. Considering the fact that if C had interacted with M in play, the maximum value for this behavior would be 60, one can see quickly that in standard situation C, C's interaction with M occurred for less than one-fourth of the available time.

Standardization of environments in which human interaction occurs permits study and comparison of behaviors of M-C pairs from different populations, for example, M-C pairs involving children who are physically handicapped, or nonhandicapped, or who present psychiatric problems. Such quantified information should facilitate understanding of behavioral parameters that might be expected or not expected across samples, and might contribute data to support theory and conceptualization in the area of parent-child interaction.

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Table 1

Problem Behaviors of Children and the Occasions During Which They Were Expected to Occur as Reported By Mothers in the Pilot Sample

Child Behaviors	Occasions
1. Self-help activities: refuses dressing and undressing, refuses self-feeding, refuses bathing self, asks assistance unnecessarily, dawdles inordinately.	1. a) Bedtime b) Mealtime c) Getting ready to go somewhere
2. Continuous disruptive, destructive behavior: wanders, throws, destroys	2. a) M is occupied and not in C's presence: in another room, telephoning, cooking, etc. b) M occupied and in C's presence: telephoning cooking, in grocery store, in automobile.
3. Attention-seeking: talks to M, etc. hangs on to M, demands M's lap, waves hands in M's face, stands in front of M, interrupts, pulls on M's clothing.	3. a) M occupied with company in home b) Father at home c) Parents sit down to relax, talk, or watch TV d) Visiting in other homes e) In public places; on street; in restaurant, in supermarket.
4. Cries continuously.	4. a) Following M's refusal of any C-request. b) M leaving vicinity of C. c) Strangers approaching
5. Play activity: does not play independently, or only plays independently.	5. a) Only when M is present. b) Only when M is absent.
6. Negative, noncompliant behaviors: displays temper, bites, kicks, cries, runs away from M, refuses, does not respond to M.	6. a) Following M's refusal for C's compliance. b) Following interactions or communications with C that are initiated by M.

Table II

Recurrent Situations In Which Mothers' Management of Their Children Reportedly Breaks Down and the Laboratory Analogs that Reflect Each Situation (M = Mother, C = Child, O = Other, S = Specialist)

Expected Problem Situations Reported by Mothers	Standard Situation	Code
1. I can't read a book, watch TV or sew but what he interferes, wants my attention, or hangs on me.	M occupied, C to play alone	A
2. I can't get through to him; he won't mind me. He never does what I ask.	M & C play together a) C's game rules b) M's game rules Clean-up	 B C Z
3. a) When we are both together, he won't let anyone else come near us. When they do, he screams. b) She always hangs on me when someone comes - she even rips my clothes, she hangs on so tightly	O enters room, or O approaches C while M is occupied in room	D
4. a) I can't talk with a neighbor over a cup of coffee. b) We never have company any more, he's such a nuisance. c) He nags and persists so much whenever someone else is around.	M & O visit, C is to play alone	F
5. a) I'm going to put him into a day nursery for a few days so I can paint a room in the house; he gets into things when I don't watch him. b) I can't let him go out of my sight, he runs away, he destroys things.	M leaves C alone	G
6. He wouldn't let the doctor look into his eyes (mouth, etc.) and it is necessary that we know whether he's not seeing, is retarded or whether he just won't mind.	S examines C - M in room, or M leaves	S
7. a) If someone just rings the doorbell she cries and cries. b) He won't let me leave him even for a minute, even to get a cup of coffee, so, I carry him with me.	M increases physical distance from C while in room M moves C from lap to floor.	P

Table III

Number of Standardized Situations Used and Duration of the Program for Each of the Ten Mother-Child Pairs

Pair	Duration of Program	Actual Number of Sessions	Standard Situations Used
1	3 mo.	24	B, C, G, F, Z
2	2 mo.	16	A, C, G, F, Z
3	$2\frac{1}{2}$ mo.	18	B, C, F, Z
4	$2\frac{1}{2}$ mo.	16	B, C, Z
5	2 3/4 mo.	15	A, B, C, Z
6	3 mo.	18	C
7	2 3/4 mo.	14	B, C, Z
8	$2\frac{1}{4}$ mo.	10	C, P, T
9	$2\frac{1}{2}$ mo.	12	B, C, Z
10	2 mo.	8	B, C

Table IV

Baseline Data for One Pair Showing Mother and Child Behaviors
in Three Standardized Situations B, C and Z
(Values = rate per min.)

BEHAVIORS	BASELINE SESSIONS											
MOTHER	STANDARD SITUATION B				STANDARD SITUATION C				STANDARD SITUATION Z			
	1	2	3	4	1	2	3	4	1	2	3	4
1. Commands to C (each)	2.3	1.3	3.3	3.3	4.1	5.7	3.0	7.4	4.0	8.9	4.6	10.5
2. Rewards to C (each)	0.6	1.0	0.3	0.0	0.6	0.0	0.6	0.4	1.0	1.6	0.3	0.3
3. Gives up control (duration)	0.0	1.0	2.0	0.0	2.7	4.0	0.3	3.6	1.6	3.0	2.9	1.0
4. Follows in C's Play (duration)	8.3	16.6	11.5	26.0	Not Appropriate				Not Appropriate			
CHILD												
1. Changes Activity (each)	0.0	2.3	0.6	1.3	1.0	1.4	1.1	0.6	1.8	2.0	2.1	1.5
2. Complies (each)	0.3	0.0	0.3	0.0	0.7	0.6	0.4	0.6	3.3	1.0	1.3	4.0
3. Noncompliance (duration)	3.3	2.6	11.6	3.3	22.4	14.7	3.1	13.4	4.4	13.9	8.0	9.0
4. Interacts with M (duration)	6.3	23.6	9.0	18.0	16.6	10.3	6.0	2.4	20.0	8.3	7.0	17.0

Table V

Data From a Sample of Mother-Child Pairs Showing Baseline, Last Three Shaping, and Recheck Session Values (In Rate Per Min.*) in Standard Situation C

	SESSIONS						
MOTHERS (M praises C)	BASELINE			FINAL SHAPING			RECHECK
	1	2	3	X	Y	Z	A
1	0.6	0.0	0.6	4.4	3.1	1.9	2.4
2	0.4	0.8	0.6	3.2	3.0	3.0	2.8
3	0.6	1.0	0.4	5.6	6.2	7.3	3.1
4	0.6	1.4	1.3	1.6	1.5	2.3	3.6
.							
n							
CHILDREN (C interacts)							
1	16.6	10.3	6.0	45.0	45.3	44.8	51.1
2	39.8	30.6	35.4	51.2	56.6	56.0	54.0
3	9.0	9.2	4.5	25.1	48.0	32.3	32.0
4	30.2	34.0	38.0	50.0	57.5	55.1	57.6
.							
n							

* 60 sec = maximum value per session